



(19)

(11) Publication number:

01217921 A

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PATENT ABSTRACTS OF JAPAN(21) Application number: **63042351**(51) Intl. Cl.: **H01L 21/302**(22) Application date: **26.02.88**

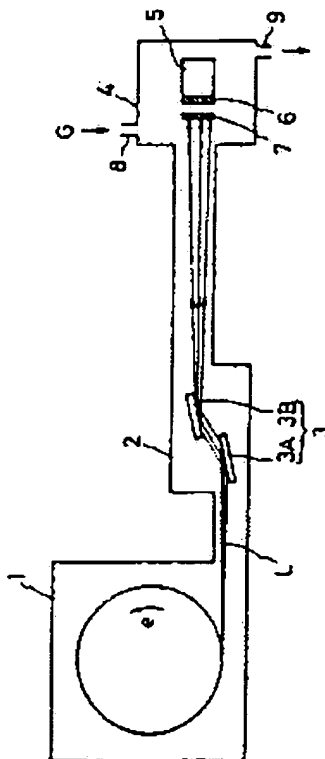
<p>(30) Priority:</p> <p>(43) Date of application publication: 31.08.89</p> <p>(84) Designated contracting states:</p>	<p>(71) Applicant: NIPPON TELEGR & TELEPH CORP <NTT></p> <p>(72) Inventor: URISU TSUNEO UCHIUMI YUICHI TAKAHASHI JUNICHI</p> <p>(74) Representative:</p>
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(54) ETCHING METHOD

(57) Abstract:

PURPOSE: To accurately miniaturize by mounting an etching mask on a substrate, supplying etching reaction gas, and irradiating the surface of the substrate with soft X-rays or vacuum ultraviolet rays, thereby etching the irradiated part of the substrate.

CONSTITUTION: An optical system 3 for introducing a radiated light L of soft X-rays or vacuum ultraviolet rays from an electron synchrotron light radiating device 1 into a reaction chamber 4 is composed of two planar reflection mirrors 3A, 3B. The material of a substrate 6 to be etched with the light L is made of SiO₂, Si₃N₄ or polysilicon added in high concentration with phosphorus or boron. Etching reaction gas G includes small amount of oxygen to be added fluorine and chlorine series etching gas such as SF₆, CF₄, SiF₄, CCl₄, Cl₂, XeF₂, etc. Thus, since the etching for a thin filmlike etching mask 7 made of a material of semiconductor of Si, Ge or metal and their polycrystal scarcely advances even under the irradiation of reaction gas, microminiaturization of 0.1 μm or less can be performed.



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